

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants : Masaaki OYAMADA et al. Art Unit: 1792
Application No.: 10/820,024 Examiner: Lightfoot, E.
Filing Date: April 8, 2004
Title : CONDUCTIVE ELECTROLESSLY PLATED POWDER AND
METHOD FOR MAKING SAME

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION UNDER 37 CFR 1.132

Sir:

I, Shinji Abe, do declare and state as follows:

I am one of the applicants of the above-identified application;

I have been employed by NIPPON CHEMICAL INDUSTRIAL CO., LTD for 10 years as a researcher in the field of conductive electroless plated powders;

I have read all of the Office Actions in the above-entitled application, and have read and am familiar with each of the references cited in the Office Actions by the Examiner; and

The following experiments were carried out by me or under my direct supervision and control and the results are true and correct to the best of my knowledge.

I. Object

The purpose of this experiment is the following (1):

(1) To verify that when observed with a scanning electron microscope at a magnification of up to 100,000, columnar structures extending in a direction of a thickness of a nickel film of electroless nickel plated powder are not recognized. This nickel film is produced by 1) the method described in Example 2 of Kawakami et al. (Japanese Unexamined Patent Application Publication No. 1-242782) and 2) the electroless plating treatment of Example 2 of Kawakami et al. is repeated.

II. Brief Description of the Drawing

FIG. 1 is a SEM image (magnification of $\times 100,000$) showing the cross-section in the thickness direction of the nickel film of the electroless nickel plated powder obtained in Experiment 1.

Fig. 2 is a SEM image (magnification of $\times 30,000$) showing the top view of the nickel film of the electroless nickel plated powder obtained in Experiment 1.

Fig. 3 is a SEM image (magnification of $\times 30,000$) showing the top view of the nickel film of the electroless nickel plated powder obtained in the present invention.

III. Experiment

(1) Experiment 1

An experiment was carried out according to the description at page 7, lower right column, line 17 to page 8, upper right column, line 10 of Kawakami et al. (see page 22, line 19 - page 24, line 11 of the translation). As the complexing agent, tartaric acid, which is described in Example 2 in Table 4 at page 8, lower left column of the patent application publication (see page 25 of the translation), was used. Also, the molar ratio of the solution **a** (Nickel sulfate) and the solution **b** (Sodium hypophosphite) is 1:2.5 (see Table 5 on page 25 of the translation). A first plated nickel film (first nickel film layer) is formed on the surface of the core particles.

The method of electroless plating treatment in Example 2 of Kawakami et al. was repeated to reapply the solution **a** (Nickel sulfate) and the solution **b** (Sodium hypophosphite) over the first plated nickel film. A second plated nickel film (second nickel film layer) was formed on the first plated nickel film by repeating the method of electroless

plating treatment.

IV. Result and Discussion

(1) Results of Experiment 1

The electroless nickel plated powder obtained in Experiment 1 was embedded in an epoxy resin, followed by curing. Then, the resin was cut to expose a broken-out section. Using the broken-out section as a measuring object, the cross-section in the thickness direction of the nickel film of the electroless nickel plated powder was observed with a SEM. The result thereof is shown in Fig. 1 below. The SEM image shown in Fig. 1 has a magnification of $\times 100,000$. As is evident from the result shown in Fig. 1, the nickel film was composed of an aggregate of many crystal grains. However, the columnar structures extending in a direction of a thickness of a nickel film of electroless nickel plated powder were not recognized in the thickness direction of the nickel film.

V. Conclusion

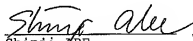
(1) Conclusions of Experiment 1

When observed with a scanning electron microscope at a magnification of up to 100,000, columnar structures

extending in a direction of a thickness of a nickel film of electroless nickel plated powder were not recognized. This nickel film was produced by 1) the method described in Example 2 of Kawakami et al. (Japanese Unexamined Patent Application Publication No. 1-242782) and 2) the electroless plating treatment of Example 2 of Kawakami et al. was repeated.

I further declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: April 12, 2010


Shinji ABE

10.0kV x100k

500nm

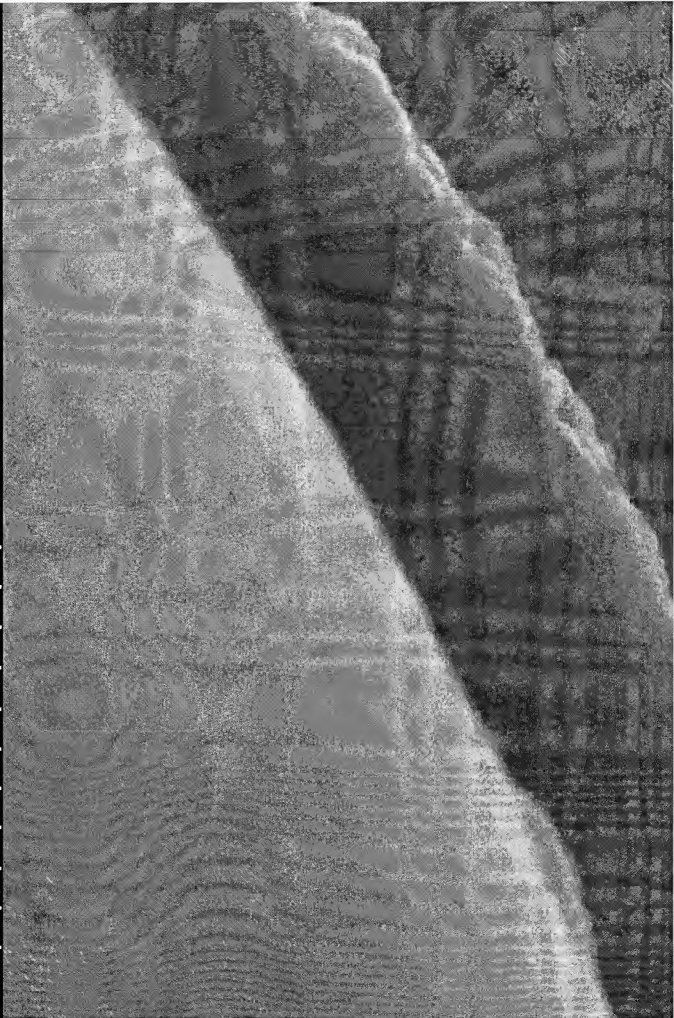


FIG. 1

3

10.0kV X30.1k 998nm

FIG. 2

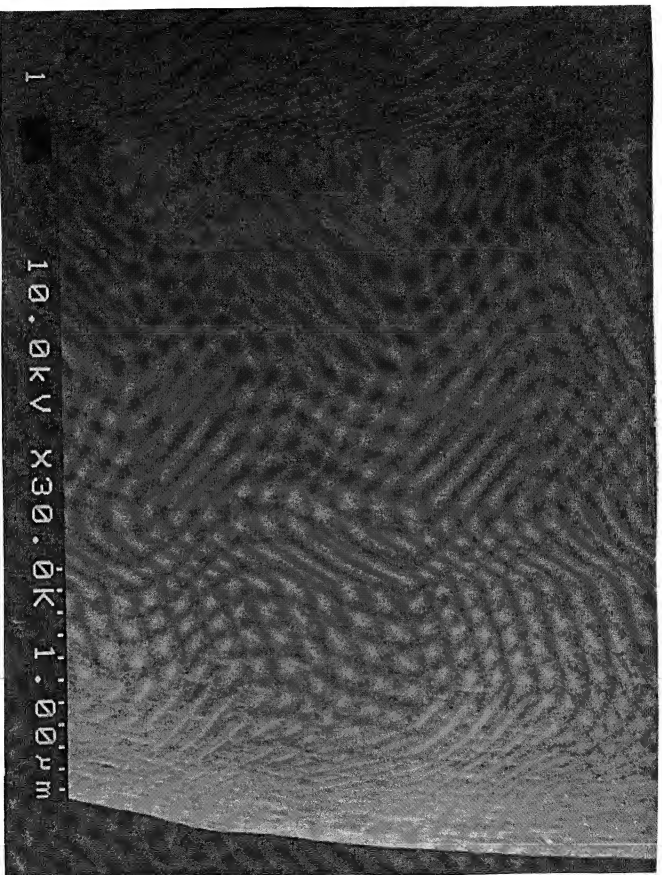


FIG. 3